

IN THE CLAIMS:

1. (currently amended) A method for obtaining data, said method comprising scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire image data including attenuations from a Compton process and to acquire image data including attenuations from a photoelectric process, the MECT including an x-ray source rotatable about the patient, the MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect and within an energy region associated with medical computed tomography (CT).

2. (original) A method in accordance with claim 1 wherein said scanning comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data allowing computation of the cerebral blood volume of the patient.

3. (original) A method in accordance with claim 1 wherein said scanning comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data allowing computation of the cerebral blood flow of the patient.

4. (original) A method in accordance with claim 2 wherein said scanning further comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to allow computation of the cerebral blood flow of the patient.

5. (original) A method in accordance with claim 4 further comprising calculating a mean transit time of the cerebral blood flow based on the cerebral blood flow data and the cerebral blood volume data.

6. (original) A method in accordance with claim 1 further comprising performing a Compton and photoelectric decomposition of the acquired data to provide an improved gray-white matter contrast in the brain.

7. (original) A method in accordance with claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to characterize a plaque in an carotid artery.

8. (original) A method in accordance with claim 1 further comprising monitoring a CT number change in a contrast-enhanced brain study to provide improved CT number accuracy.

9. (original) A method in accordance with claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to facilitate a reduction in image artifacts.

10. (original) A method in accordance with claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to measure a size and number of white matter lesions.

11. (original) A method in accordance with claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to measure a volume of brain atrophy in a global brain structure.

12. (original) A method in accordance with claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to measure a volume of brain atrophy in at least one brain substructure.

13. (original) A method in accordance with claim 1 further comprising performing a Basis Material Decomposition (BMD) of the acquired data to discriminate between a Mild Cognitive Impairment condition of the patient and an Alzheimer's Disease (AD) condition of the patient.

14. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including a location of a tagging ligand.

15. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a detection of a labeled drug.

16. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy

Computed Tomography (MECT) system to acquire data regarding a location of a tagged ligand with an affinity to a specific labeled drug's receptors, and a detection of the specific labeled drug to simultaneously monitor the labeled drug's distribution and the drug's effect on the kinetics of the receptors.

17. (original) A method in accordance with claim 1 wherein said scanning comprises scanning a head of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a location of a tagged ligand with an affinity to a neurotransmitter released by a specific labeled drug's receptors, and a detection of a labeled drug to simultaneously monitor the labeled drug's distribution and a concentration of the neurotransmitter.

18. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a targeting agent of a tumor.

19. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to acquire data regarding a targeting agent of a tumor wherein the targeting agent comprises a tumor-specific ligand.

20. (original) A method in accordance with claim 1 further comprising classifying tissue as cancerous and non-cancerous based upon the acquired data.

21. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to provide an improved detection of concussion of supporting structures in the neck and fracture of the bones in the head and neck.

22. (original) A method in accordance with claim 1 wherein said scanning comprises scanning at least one of a head and a neck of a patient with a Multi-Energy Computed Tomography (MECT) system to provide an improved detection of abnormal growth on the bones of the head and neck.

23. (currently amended) A Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT comprising: a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of a scan of the head, wherein the first energy spectrum and the second energy spectrum are within an energy region associated with medical computed tomography (CT); generate an image of at least one of a cerebral blood volume of the patient and a cerebral blood flow of the patient; and calculate a mean transit time of the cerebral blood flow based on the received data.

24. (previously presented) A MECT system in accordance with claim 23 wherein said computer further configured to perform a Compton and photoelectric decomposition of the received data to provide improved gray-white matter contrast in the brain.

25. (previously presented) A MECT system in accordance with claim 23 wherein said computer further configured to perform a Basis Material Decomposition (BMD) of the received data to measure a volume of brain atrophy in a global brain structure.

26. (previously presented) A MECT system in accordance with claim 23 wherein said computer further configured to perform a Basis Material Decomposition (BMD) of the received data to discriminate between a Mild Cognitive Impairment condition of the patient and an Alzheimer's Disease (AD) condition of the patient.

27. (previously presented) A Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT comprising: a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of at least one of a head of the patient and a neck of the patient; receive data regarding a second energy spectrum of the scan; and generate a location of a tagging ligand based upon the received data.

28. (currently amended) A Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT comprising: a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of at least one of a head of the patient and a neck of the patient; receive data regarding a second energy spectrum of the scan, wherein the first energy spectrum and the second energy spectrum are within an energy region associated with medical computed tomography (CT); and detect a labeled drug based upon the received data.

29. (currently amended) A Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT comprising: a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of the scan, wherein the first energy spectrum and the second energy spectrum are within an energy region associated with medical computed tomography (CT); generate a location of a tagged ligand with an affinity to a neurotransmitter released by a specific labeled drug's receptors based upon the received data; and detect a labeled drug based upon the received data to simultaneously monitor the labeled drug's distribution and a concentration of the neurotransmitter.

30. (currently amended) A Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT comprising: a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of the scan, wherein the first energy spectrum and the second energy spectrum are within an energy region associated with medical computed tomography (CT); and perform a Basis Material Decomposition (BMD) of the received data to characterize a plaque in a carotid artery.

31. (currently amended) A Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT comprising: a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of the scan, wherein the first energy spectrum and the second energy spectrum are within an energy region associated with medical computed tomography (CT); and classify tissue as cancerous and non-cancerous based upon the received data.